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AUTHOR Leslie, Judith W.
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ABSTRACT

Designed to facilitate and increase the interaction of college administrators with automated systems, this guide addresses three basic questions: what is the value of technology in an institution; what is the priority of technology in relation to other aspects of the institution; and what is the commitment to technology as reflected in the allocation of financial resources? A discussion of how values are formed presents a framework which identifies the social, political, and economic forces affecting administrators' attitudes toward the use of technology. To illustrate this framework, administrators' attitudes within a specific postsecondary institution--Pima Community College--are analyzed. The implementation of change is also discussed and five change models are described as they have been applied at this institution: (1) the Human Relations Model; (2) the Power Model; (3) the Restructuring Model; (4) the Temporary Systems Model; and (5) the External Influence Model. Ways in which these models can enhance the value, priority, and commitment to technology in an institution are considered. The processes and direction of value formation are shown in three figures, and three references are listed. (LMM)

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THE PRESIDENT'S ROLE IN BRINGING ABOUT
TECHNOLOGICAL ADVANCEMENT IN
HIGHER EDUCATION INSTITUTIONS

Judith W. Leslie

Vice President for
Planning and Development

Pima Community College

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Introduction

"Does the president keyboard?" You may be thinking the answer is, "Yes or no." But does either response answer the question that is being asked? What is the question behind the question, "Does the president keyboard?"

The real question is threefold: what is the value of technology in an institution; what is the priority of technology in relation to other aspects of the institution; and what is the commitment to technology, as manifest overtly in the allocation of financial resources?

The threefold question, however, still masks the statement of the problem. For most institutions the answer to the initial question, "Does the president keyboard?" is, "No." Likewise, the value of technology may be only at the formative stage and consequently of relatively low priority and minimal funding. The problem becomes then, how are values and consequent practices in an institution changed?

The purpose of this paper is first to discuss how values are formed, specifically the value of technology; second to discuss how change can be brought about by presenting five models of change and an example of each; and finally to discuss how these change models can enhance the value, priority, and commitment to technology in an institution.

Value Formation

I shall begin by presenting a framework to illustrate value formation. The participants are the individual, the family, the community, and society. The forces assumed to affect value formation are categorized as social, political, and economic. These forces may be exerted in a progressive or conservative direction; and the process of value formation may be convergent, from society to individual, or divergent, from individual to society (see Figures One and Two).

A further elaboration of these framework components follows.

Forces and Participants

As discussed herein, social forces reflect the value or worth of technology; political forces reflect the priority of technology in relation to other mediums and is a manifestation of the value of technology; economic forces reflect the commitment to technology as evident in the allocation of

**Figure One
Value Formation:
From Society to
the Individual**

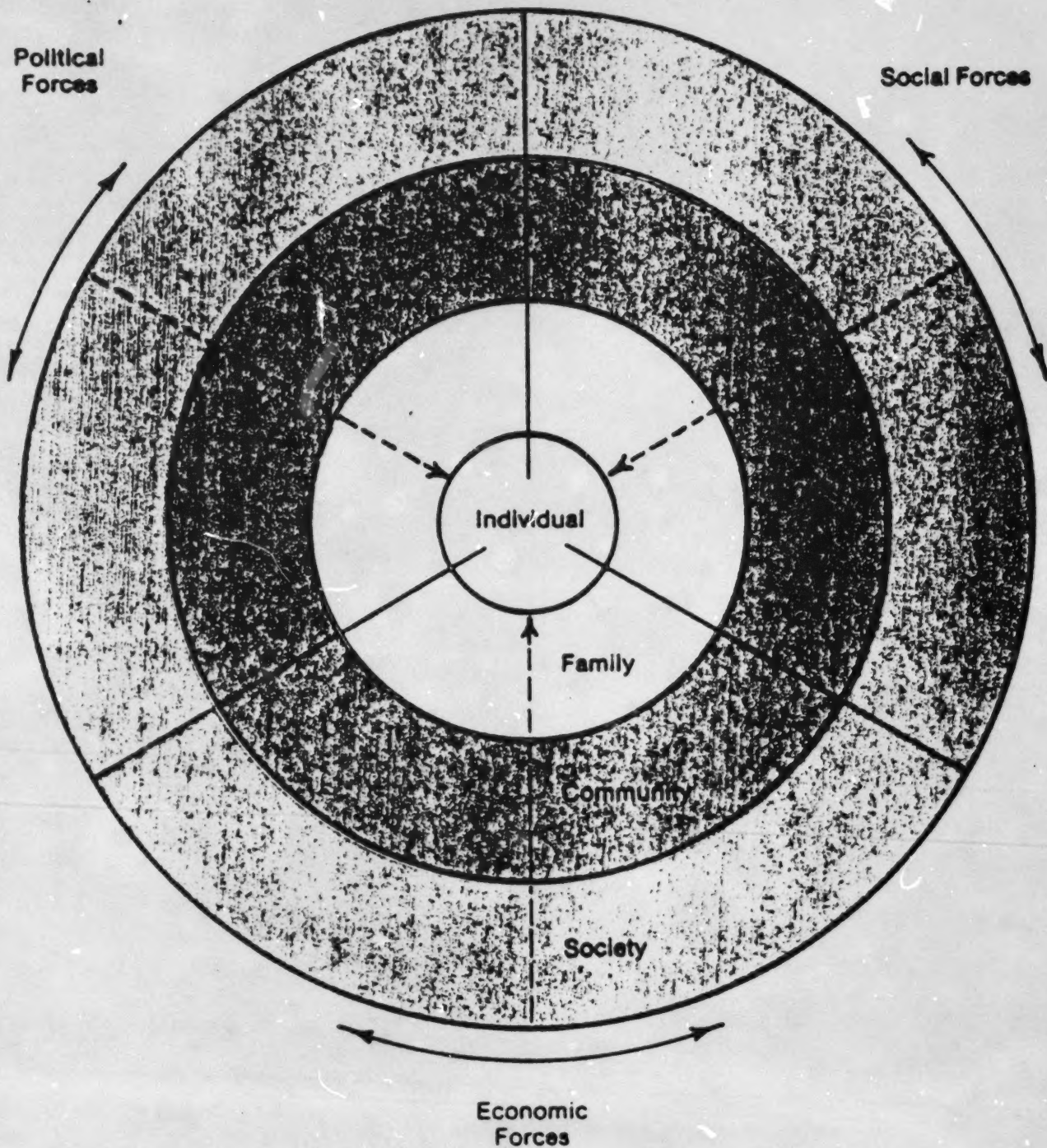
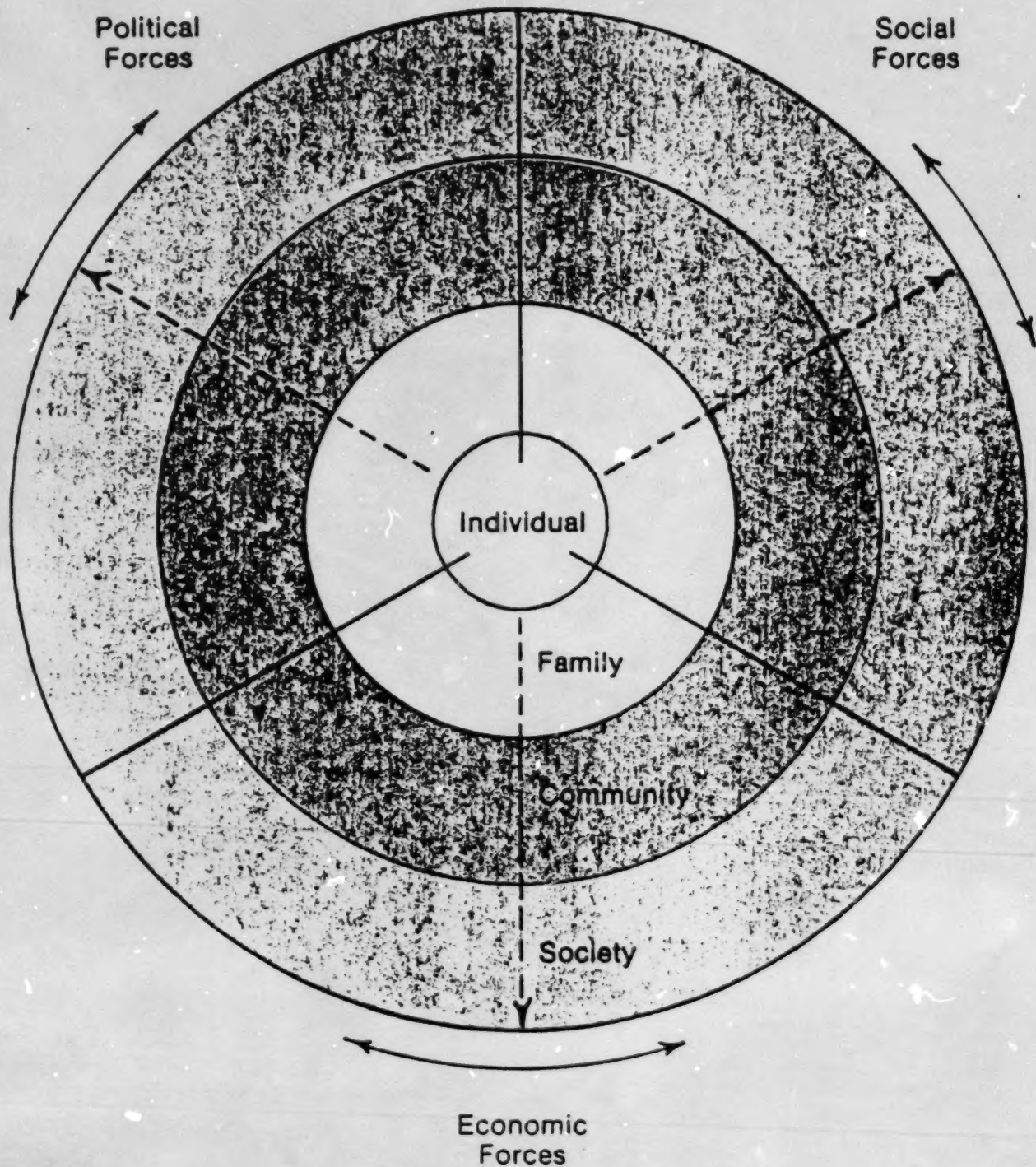


Figure Two
Value Formation:
From the Individual
to Society



resources, which follows from the priority and value of technology. It should be noted that these forces are interdependent, and thus not necessarily sequential.

The scope of social forces, as presented herein, begins with the individual and, moving through the family and community, extends to society. Beginning with the individual, there are a number of social elements which affect the individual's use of technology. The first of these is hypothesized to be age. Given that the advent of technology is a recent phenomenon from an historical perspective, older persons have been exposed to technology only recently when their behavior patterns and values have already been formulated. Younger individuals have been exposed to technology at a time when their values are still being formulated and behavior patterns learned.

The second social element hypothesized to affect usage of technology is gender of the individual. Traditionally, males have been socialized to interact with mechanical objects, while females have been socialized to interact with other beings or facsimilies. Use of technology requires a degree of mechanical manipulation and quantitative skills--both associated more with males than females. It is important to note, however, that because a keyboard is necessary to utilize technology, males have to overcome the secretary image of "typing." The word "keyboard" itself represents a change in nomenclature to avoid the clerical connotation of typing.

The third hypothesized social element is education and training. In academe, many administrators come from a liberal arts background. Only more recently has technology been used to any scale as an instructional medium and computer science is a relatively new curriculum. Consequently, there are a limited number of individuals who have had formalized training in or experience with the use of technology. Age and gender also are correlates of education and training: females traditionally have pursued the social science fields; and because technology has not been a traditional part of the curriculum, an older individual is less likely to have had any formalized training in its use.

The scope of social forces now extends to the family. It is within this unit, that an individual is first exposed to values. To the extent that technology was used and valued in the home, an individual would have formulated his/her initial attitude. For the generation which is currently being raised, technology begins at a very early age and may come in the form of a toy--a pleasurable initial experience which builds a positive attitude and leads to increased and sophisticated use.

The community represents the conglomerate of individual and family units. The value of technology in the community is seen in the extent of its application, at what level, and for which purposes. Referring again to the social elements of age, gender, and education, the community may be more or less oriented to the use of technology. These elements relate to the nature of the community with respect to major industries, services, goods, and community activities.

Enlarging the scope from community to a society, in this case limited to a country, there are varying degrees of technology evident. Japan is an example of a country which obviously values technology, given its role as a basis for the country's economy. The United States, caught somewhere between an industrial and technological society, reflects inconsistency in the value of technology.

Political forces at the individual level reflect the influences exerted by the values an individual holds. Sometimes these values compete with one another and an individual is forced into determining priorities. At the family level, this conflict can become more pronounced as each individual has his/her priority, which may differ from that of another family member. The situation is magnified at the community level and more so at the societal level. The priority of the space program serves as an illustration of the varying priority technology has had at the national level.

The influence of values and priorities is manifest explicitly in the commitment of resources, a reflection of economic forces at work. For some individuals, the investment in a home computer is worthwhile; for others it is an extravagance. The family's attitude toward technology will be evident in its budget and how its time is spent. The same is true of the community and the country. As values expressed in priorities are determined, resources then are allocated. The current national budget reflects the changing priority of defense versus social programs in relation to recent years.

Direction

As used in this framework, the direction of value formation is either progressive or conservative. Progressive is used to describe behavior that embraces that which is new; conservative expresses behavior that adheres to that which is old. As this dichotomy relates to the use of technology, values of a conservative nature would be reflected in behavior which was prevalent in an industrial or agricultural era. A progressive direction would be manifest in behavior which employs the resources of the technological era, i.e., the computer.

Process

The process of value formation assumes herein either a convergent or divergent impact. A convergent process would begin at the level of society and would permeate from society through to the community, family, and finally individual (see Figure One). In contrast, a divergent process would begin with the individual whose values would emanate to the family, community, and ultimately, society (see Figure Two). As the divergent process relates to technology, today's youth may value technology highly through their interaction with computer games; however, their families, community, and society may not have formed such a value. An illustration of a convergent process as it relates to technology is when a given society, such as Japan, values technology, but a community, family, and individuals may not have formed such a value.

The assumptions used in the foregoing discussion are now applied to a specific population in a given setting: administrators in a particular community college.

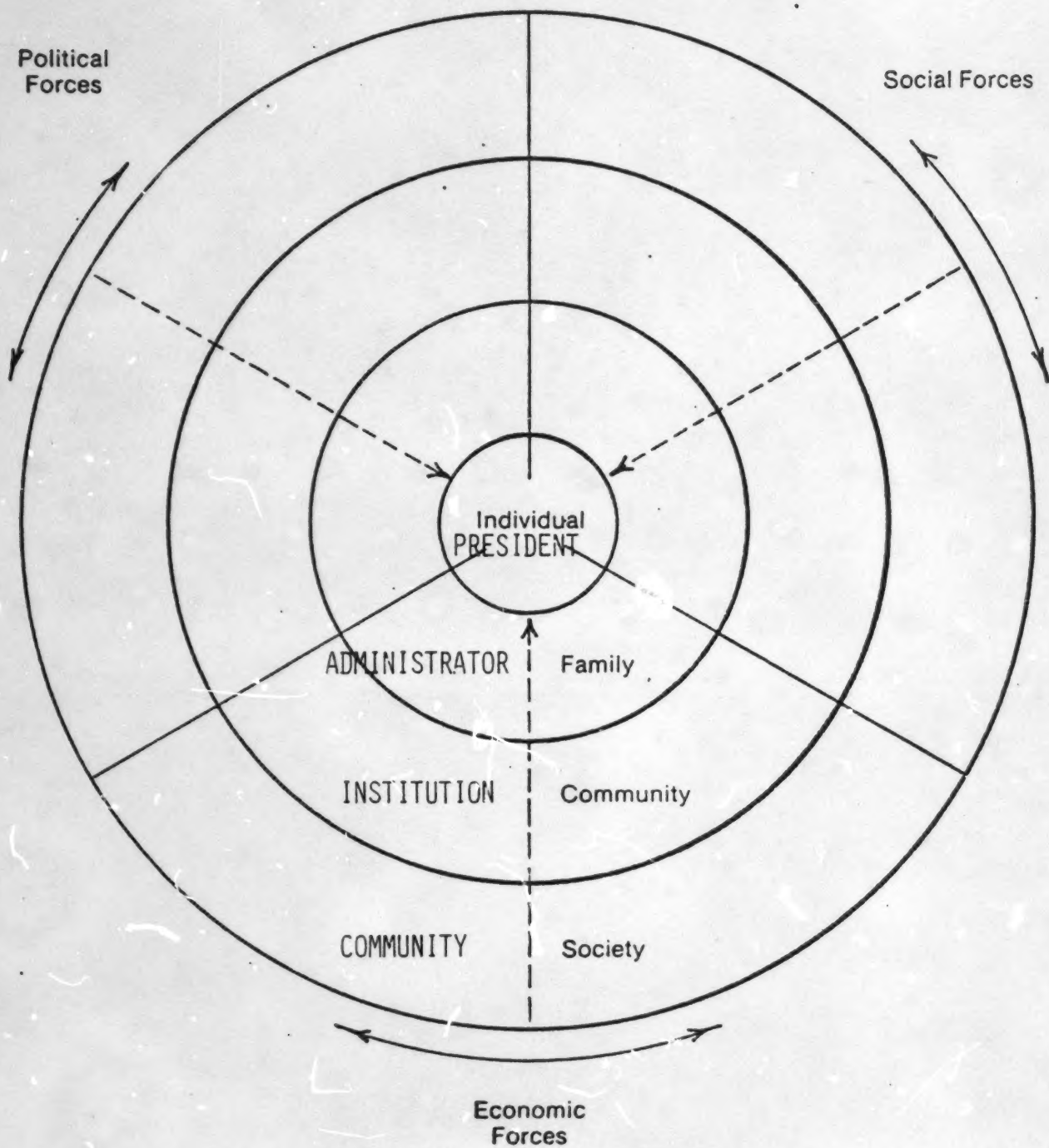
Imposed upon the framework is an altered version of participants. The individual is transposed to the president, the family is the administration, the community is the institution, i.e., faculty, and the society is the community, Tucson, Arizona. Using the three forces of social, political and economic, Pima College is analyzed. (See Figure One-A).

The social elements hypothesized to affect the use of technology were age, gender, and education. Applying these elements to the participants, the president and the average age of administrators is over 40; the faculty is younger, with an approximate average age in the mid-thirties. The average age in the community is late twenties. These data suggest that the convergent process of value formation, from community to president may be applicable.

In terms of gender, the president and the majority of the administrators are male; within faculty approximately 58.5 percent are males; and within the community there are slightly more females than males. These data also support a convergent process.

The last social variable is education and training. The president holds a doctorate, but not in a technology-related field; 33 percent of administrators hold doctorates, but only a few are in a technology-related field. Approximately 14.8 percent of faculty hold doctorates; of these, 7.5 percent are in technology-related fields. As to the community, Tucson is described as having an above average educational level as compared to national norms and many citizens are employed in technology-related businesses and industries, particularly in recent years with the location of IBM and supporting industries. Education and training, as variables and predictors of the value of technology, are mixed. All segments appear to have high levels of education; the faculty

Figure One
Value Formation:
From Society to
the Individual



and community, however, tend to be more involved in the use of technology than do administrators.

The political forces are now examined as they relate to the value of technology at Pima College. At the president's level, he reflected a relatively high priority for technology as evidenced last year in one of his management plan objectives to assess the effectiveness of the Computer Center and make recommendations for a hardware upgrade. Within the administration, the value of technology may be present, but generally has not been manifest directly by a majority. The faculty, however, were vocal in their requests for hardware and software and at one point appealed directly to the Board of Governors for support. Generally speaking, though, faculty have asserted facilities needs as greater than hardware needs. The community is beginning to reflect a greater priority for technology. The Arizona Town Hall of 1980, in which citizens of Pima County participated, agreed that the state should pursue high technology industries in order to become the nations leading center of science and technology.

The economic forces at work at Pima College reflect whether there is a commitment to the value of technology as recognized by its political priority. As an outcome of the assessment of the Computer Center, the president supported an upgrade of computer hardware of approximately one million dollars. He also supported the acquisition of a word processor for his clerical staff. Within the administrative group, allocations for capital have tended to be primarily facilities related. There are exceptions, however, particularly on those campuses where computer science and electronic courses are offered. Although the faculty do not have authority to allocate resources, they are turning to other sources of revenue. A microcomputer center was established as a result of a grant awarded by the National Science Foundation to a faculty member. It should be noted that the administrator in whose area the grant was awarded has been overtly supportive of the use of technology and pushing in a progressive direction.

The Tucson community is exhibiting progressive economic forces. The economy in Arizona in general is shifting from one dominated by natural resource dependence (farming and mining) to one that is dominated by high technology information and information-processing based activities.

Applying the "directions" concept of the value formation framework to Pima College reveals both progressive and conservative forces at work. At the individual, or president's level, while he does not utilize technology directly, the values the products it produces. Extending to the administration, if one were to visit the offices of individual administrators, no terminals would be evident and only two word processors are available. A generalization could be made that conservative forces

tend to dominate progressive forces. Within the faculty, progressive forces are becoming stronger than conservative, being brought about to a large extent by the student and community demand for computer science and electronic course and program offerings. The community, likewise, is experiencing a shift in its economic base to high-technology industries. In terms of direction, then, one could conclude that at the community and institutional level, the direction is increasingly heading in a progressive direction and at the administration level, the direction may not be moving as rapidly in a progressive direction as at the community level.

The final point of analysis using the framework is process. As alluded to above, the social, political, and economic forces tend to support a process that begins at the community level and permeates through the institution to the president. It should be noted, however, that the process in practice does not necessarily entail a sequential process of community to faculty to administration to president. Quite the contrary in this institution as the president interacts directly with the community and faculty. This may account for his generally positive attitude toward and support for the use of technology. Overall, however, Figure One-A, which depicts the process as one in which the value of technology primarily comes from the community and faculty, is more applicable to Pima than the one wherein the value is initiated at individual levels.

To summarize the value of technology at Pima College, the following generalizations are made:

1. Social forces are more positive at the faculty rather than administrative level.
2. Political forces are more positive at the faculty and presidential level than at the administrative level.
3. Economic forces are more positive at the faculty and presidential level than at the administrative level.
4. Progressive forces are stronger at the community and faculty level than at the administrative level.
5. The process of value formation tends to be convergent, from the community and faculty to the administration.

In response to the threefold question posed initially; what is the value, priority, and commitment of and toward technology at Pima College, the generalizations suggest the following answers:

1. Technology is valued, but primarily at the community, faculty level.
2. Technology has priority at the community, faculty, and presidential levels.
3. A commitment to technology is evident primarily at the community and presidential level.

The inference of these answers is that the most positive participants are perceived to be the community, the faculty, and the president, with the less positive participants being the administration. Although this conclusion is related specifically to Pima College, many institutions undoubtedly would come to the same conclusion. The problem becomes then, how can the value of technology be increased which leads to the fundamental question of how can change be brought about in an institution--change focused at the administrative level?

Value Change

Thomas Kuhn in his book The Structure of Scientific Revolutions wrote about how advances are made in the scientific field. He notes that there is a paradigm in science that is a "climate" of opinion which governs the choices made. He observes that the men who revolutionized science were always those who changed the paradigm. Lyndon Johnson once said, "Get your head above the grass." Someone else said, however, "Any rooster who sticks his head above the grass will get a rock thrown at it." Warren Bennis in his book, The Unconscious Conspiracy asks, "How do you communicate to people that certain changes have to take place without creating in them deep resistance based on role irrelevance, incompetence and insecurity?"¹ Extrapolating and inferring from Bennis' work, five models of change are presented: (1) the Human Relations Model, (2) the Power Model, (3) the Restructuring Model, (4) the Temporary Systems Model, and (5) the External Influence Model. Each is discussed below as it has been applied to Pima College.

Human Relations Model

This model is the one of which Bennis speaks the most. The model was developed as a result of his work at MIT on small group behavior. The model relies on three basic elements:

participation by those involved in change, trust of those who are initiating the change, and clarity as to what the change will be. He states that, "the more participation by the people to be affected by the change, the better the chances for adoption and acceptance rather than limitation."² Regarding the element of trust, Bennis writes, "the more trust in the people advocating the change, the more implementation follows."³ As to clarity, Bennis asserts, "the clearer we are about what the innovation is going to be, all things being equal, the better the chance that change will be adopted."⁴ Bennis points out that there are some data to show that the Human Relations Model works, but not often enough. The three elements of participation, trust, and clarity are not always present.

The Human Relations Model has been implemented at Pima College utilizing as a vehicle the writing of a major grant proposal of \$1.6 million for a five-year period. To formulate the proposal, a college-wide steering committee was constituted. The members were either selected by their respective faculty and staff constituencies or, in the case of the executive staff, appointed by the president. Thus, the administrators who would be responsible for directing and coordinating the grant and the faculty and staff who would be responsible for implementing the grant, if awarded, participated or were represented in defining the change. The element of trust was structured to be present as those faculty selected were noted to be trusted by their colleagues and administrators. It is important to note that these faculty were strong advocates of change-change toward the electronic institution concept. The third element of clarity was also present as dictated by the terms and conditions of the grant, supported by the application of the Human Relations Model. The grant guidelines required the establishment of five-year goals, yearly objectives, and performance evaluation measures. In addition, a narrative description of a given project was necessary.

It is interesting to note that the majority of projects developed for the grant were technology-related and typically generated by faculty, a group seemingly positive toward technology as revealed by the analysis of participants in value formation discussed above. Also noteworthy is that the committee as a whole established project priorities and the more technology related ones were ranked the highest. The Micro-computer Instructional Services project was ranked highest and within the top seven, the following were included: Office Automation Project, Instructional Computing (which entailed establishing micro/mainframe communication and campus networks), Administrative Computing (to incorporate a data base management system, interactive business graphics, and development of network capabilities) and a Center for Institutional Design/Professional Development in which a technology training program would be designed and conducted.

The effectiveness of the Human Relations Model, as applied to bringing about change at Pima College could be viewed as effective; however, this change is only at the planning stage and may not come about since it is dependent upon the award of the grant. As will be discussed later, however, measures were taken to account for this condition.

Power Model

Bennis concludes that when a Human Relations Model does not work, it is sometimes necessary to use a power model. Referring to the work of Mortimer and McConnell, Sharing Authority Effectively, there are several important resources of power. Among the more obvious are position, legal sanctions, money, expertise, time, information, and credibility. They discuss power in relation to two types of authority: formal and functional. Formal authority is executed primarily through position and the sanctions inherent in a position. Functional authority is exercised through possession of traits such as expertise, credibility, charisma, trust, and information. They conclude that the more effective authority is functional, observing that traditionally faculty possessed functional authority but with the advent of collective bargaining assumed formal authority through a legally binding contract. They assert that to be an effective leader in the 80's, functional authority must be acquired. They state that the president's task is to "win" consent, not demand it.

The Power Model has been implemented at Pima College using both formal and functional authority, with greater reliance on functional. In exercising his formal authority, the President directed his staff to develop the grant, as discussed above, and in the budget planning process directed that a given amount of funds be set aside for developmental efforts. Functional authority was exercised primarily in the grant steering committee as faculty members who possess expertise, credibility and charisma took the time to develop projects of a technological nature. This authority became evident as administrators on the committee supported efforts of the faculty members. Consequently, both a Human Relations and a Power Model were employed to bring about change. Other models also were applied.

Restructuring Model

How frequently does one observe an organizational realignment in an institution? It has become a practice within institutions as a means of changing the level of authority of positions and the persons who occupy such positions. Relationships among positions are typically altered as a realignment occurs. There is an assumption that on an organizational

chart, the higher the "box" the greater the authority, especially if the line connecting the box to other boxes extends directly to the president.

The Restructuring Model has been applied to Pima College as a means for bringing about change. The Computer Center Director had reported to an individual who reported to the Executive Assistant to the President, who reported to the President, i.e., three levels down in the organization and an indirect line. The Executive Assistant restructured her area so that the Director of the Computer Center now reports directly to her. In addition, she initiated staff meetings with the directors in her area in which information from the president's executive staff, of which she was a part, was discussed. This allowed the Director of the Computer Center to be more aware of the decision-making process and direction and priorities of the institution. The president assisted in the Restructuring Model by promoting the Executive Assistant to a Vice President for Planning and Development. This gave her access not only to the president's staff meetings but also to the vice presidents' meetings and the budget planning meetings. The vice presidents' meetings provided a small group setting in which to discuss future plans with the president. Participation in the budget planning process was particularly important in terms of allocating resources.

The Vice President for Planning and Development also constituted a Planning and Development College-wide committee. The committee consists of faculty, staff, and student representatives from all campus locations and the four District vice presidents. The purpose of the committee is to serve in an advisory capacity to the Vice President for Planning and Development regarding the College's five year master plan, comprehensive resource development plan and, of most relevance to this discussion, a long-range technology plan for the institution. The committee will be supported by two subcommittees: an administrative users committee and an instructional users committee. These subcommittees will serve in an advisory capacity to the Director of the Computer Center regarding implementation of the long-range technology plan. Using this committee structure will provide greater visibility to technology within the institution and because of the broad representation and participation, likely acceptance and increase of its use. Thus, the third model of change was also employed at Pima College. Not to leave "any stone unturned," the fourth and fifth models also played a part.

Temporary Systems Model

Perhaps all of us are familiar with the line, "this is a pilot program," or "this will be an acting position," or even, "this move will be only temporary." Bennis observes

that by advocating change under the rubric of "temporary" renders the change less threatening and more readily accepted. Because a program is to be piloted, there is an attitude of "we have nothing to lose, let's find out how well it does." Consequently, change occurs and, if carried out successfully, becomes integral to an institution.

The Temporary Systems Model, as implemented at Pima College, was through the grant proposal as cited above. Because there was only a 50/50 chance, at best, of getting the grant, the attitude of participants toward change was positive. The effectiveness of this model was particularly evident when there was acceptance on the part of faculty and administrators to have their skills assessed and, based upon the assessment, participate in a technology training program for a five year period at the end of which they would be expected to perform at a specified level of competency. In all likelihood if such a proposal had been made as a permanent requirement of all faculty and administrators, there would have been resistance. Using a Temporary Systems Model there was only minimal resistance and some support. It should be noted here that several of the concepts developed in the grant are being incorporated into the Master Plan. Thus, the Temporary Systems Model provided a vehicle for innovative ideas to permeate the institutional planning process.

External Influence Model

This fifth and final model is particularly useful in those communities where technology-related industries are located. It is also a more effective model for a community college than a university, given the "community" orientation, support, and operation of a community college. Bennis notes that in universities, where allegiance to one's profession is strongest, the institution is nearly immune to the External Influence Model. The model is enhanced in those community colleges where their Boards of Trustees are publicly-elected officials representing the citizens of the community.

The External Influence Model has been most appropriate to Pima College given its setting in an increasingly high-technology based community, its community college mission of service to the community and its publicly-elected Board of Governors. The president meets on a regular basis with leaders of the community which may account to some degree for his positive attitude toward advancing technology in the institution. The Board of Governors, likewise, is in contact with the public. Their support was manifest recently in their approval of a million dollar upgrade to the computer and their support of electronics faculty who appealed to the Board for additional equipment and staff. The External Influence Model has been one of the more effective models for change at Pima College.

Conclusion

There is a story recounted through history regarding the oriental king who had heard that Moses was kindly, generous, and a bold leader. He asked that a portrait of Moses be brought to him so that he might see Moses' image. When he saw Moses' picture he felt he had heard correctly; however, he asked his astrologers and phrenologists for their opinion. Unlike the opinion of the king, they observed in the picture a cruel, greedy, self-seeking man. The king was puzzled by this difference of opinion; to resolve the matter he decided to visit Moses personally. When he met Moses he knew that his opinion had been right for he saw that Moses was a good man. He told Moses that his astrologers and phrenologists had been wrong in their assessment. Moses disagreed and said,

"Your phrenologists and astrologers were right. They saw what I was made of; but what they couldn't tell you was that I struggled against all that and became what I am."⁵

Like Moses, the leader who does learn to cope and change, may find him/herself quite a different person some years hence.

Bennis' words are particularly relevant to leadership and change:

"It seems to me the big test for any new leader will be whether or not he can--by identifying with the process of change--ride or even direct it and by so doing build new strengths in the process. By identifying with the change, he will find himself changing, growing."⁶

He continues,

"It is not so much the articulation of goals of what a profession should be doing that creates a practice. It is the 'imagery' that creates the understanding."⁷

And so I say to all College presidents, "Do you keyboard?" and those who are leaders, those who are directing change will answer, "Yes, I keyboard."

FOOTNOTES

- 1 Warren Bennis, The Unconscious Conspiracy: Why Leaders Can't Lead, AMACOM, 1976, New York, New York, p. 97
- 2 Ibid, p. 87
- 3 Ibid, p. 87
- 4 Ibid, p. 87
- 5 As cited in The Unconscious Conspiracy:, p. 175
- 6 Ibid, p. 175
- 7 Ibid, p. 93

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